2000
Annual Effluent Operating Report

R.E. Ginna Nuclear Plant
Rochester Gas and Electric

Docket No. 50-244

2000

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

R. E. GINNA NUCLEAR PLANT

ROCHESTER GAS AND ELECTRIC

DOCKET NO. 50-244

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1.0 INTRODUCTION

This Annual Radioactive Effluent Release Report is for the Rochester Gas and Electric Corporation R. E. Ginna Nuclear Power Plant and is submitted in accordance with the requirements of Technical Specification Section 5.6.3. The report covers the period from January 1, 2000 through December 31, 2000.

This report includes a summary of the quantities of radioactive gaseous and liquid effluents and solid waste released from the plant presented in the format outlined in Appendix B of Regulatory Guide 1.21, Revision 1, June 1974.

All gaseous and liquid effluents discharged during this reporting period were in compliance with the limits of the R.E. Ginna Technical Specifications as defined in the Offsite Dose Calculation Manual (ODCM).

2.0 SUPPLEMENTAL INFORMATION

2.1 Regulatory Limits

The ODCM limits applicable to the release of radioactive material in liquid and gaseous effluents are:

2.1.1 Fission and Activation Gases

The instantaneous dose rate, as calculated in the ODCM, due to noble gases released in gaseous effluents from the site shall be limited to a release rate which would yield $\leq$ 500 mrem/yr to the total body and $\leq$ 3000 mrem/yr to the skin if allowed to continue for a full year.

The air dose, as calculated in the ODCM, due to noble gases released in gaseous effluents from the site shall be limited to the following:

(I) During any calendar quarter to $\leq$ 5 mrad for gamma radiation and to $\leq$ 10 mrad for beta radiation.

(ii) During any calendar year to $\leq$ 10 mrad for gamma radiation and to $\leq$ 20 mrad for beta radiation.

2.1.2 Radioiodine, Tritium and Particulates

The instantaneous dose rate, as calculated in the ODCM, due to radioactive materials released in gaseous effluents from the site as radioiodines, radioactive materials in particulate form, and radionuclides other than noble gases with half-lives greater than 8 days shall be limited to a release rate which would yield $\leq$ 1500 mrem/yr to any organ if allowed to continue for a full year.

The dose to an individual, as calculated in the ODCM, from radioiodine, radioactive materials in particulate form and radionuclides other than noble gases with half-lives greater than eight days released with gaseous effluents from the site shall be limited to the following:

(i) During any calendar quarter to $\leq$ 7.5 mrem to any organ.

(ii) During any calendar year to $\leq$ 15 mrem to any organ.

2.1.3 Liquid Effluents

The release of radioactive liquid effluents shall be such that the concentration in the circulating water discharge does not exceed the limits specified in accordance with Appendix B, Table II, Column 2 and notes thereto of 10CFR20. For dissolved or entrained noble gases the total activity due to dissolved or entrained noble gases shall not exceed 2 E-4 μCi/ml.

The dose or dose commitment to an individual as calculated in the ODCM from radioactive materials in liquid effluents released to unrestricted areas shall be limited:

(i) During any calendar quarter to $\leq$ 1.5 mrem to the total body and to $\leq$ 5 mrem to any organ, and

(ii) During any calendar year to $\leq$ 3 mrem to the total body and to $\leq$ 10 mrem to any organ.

2.2 Maximum Permissible Concentrations (MPC)

2.2.1 For gaseous effluents, maximum permissible concentrations are not directly used in release rate calculations since the applicable limits are stated in terms of dose rate at the unrestricted area boundary.

2.2.2 For liquid effluents, ten times the effluent concentration values specified in 10CFR20, Appendix B, Table II, column 2, are used to calculate release rates and permissible concentrations at the unrestricted area boundary as permitted by Technical Specification 5.5.4.b. A value of 2E-04 μCi/ml is used as the MPC for dissolved and entrained noble gases in liquid effluents.

2.3 Release Rate Limits

The release rate limits for fission and activation gases from the R.E. Ginna plant are not based on the average energy of the radionuclide mixture in gaseous effluents; therefore, this value is not applicable. However, the average 2000 beta/gamma energy of the radionuclide mixture was 0.146Mev, based on the predominance of Xe-133 in releases.

2.4 Measurements and Approximations of Total Radioactivity

Gamma spectroscopy was the primary analysis method used to determine the radionuclide composition and concentration of gaseous and liquid effluents. Composite samples were analyzed for Sr-89, Sr-90 and Fe-55 by a contract laboratory. Tritium and alpha analysis were performed using liquid scintillation and gas flow proportional counting respectively.

The total radioactivity in effluent releases was determined from the measured concentration of each radionuclide present and the total volume of effluents released.

2.5 Batch Releases

2.5.1 Liquid

1. Number of batch releases:	2.42 E+02
2. Total time period for batch releases:	1.63 E+05 min
3. Maximum time period for a batch release:	2.66 E+04 min
4. Average time period for batch releases:	6.73 E+02 min
5. Minimum time period for a batch release:	1.2 E+01 min
6. Average blowdown (LPM) during periods of effluent release into the discharge canal.	1.55 E+02

2.5.2 Gaseous

1. Number of batch releases:	3.0 E+01
2. Total time period for batch releases:	2.26 E+04 min
3. Maximum time period for a batch release:	7.38 E+03 min
4. Average time period for batch releases:	7.53 E+02 min
5. Minimum time period for a batch release:	1.02 E+02 min

2.6 Abnormal Releases

On 9/21/00 from 0700 to 0830, during a planned refueling shutdown, there was an apparent outflow of air at the top of the Containment equipment hatch. The Containment Coordinator attributed this apparent outflow to swirling winds outside the hatch.

RP supervision defined this as an unplanned release since no definitive evidence was available to refute the apparent outflow of air. RP reduced the level of the equipment hatch rollup door to a level at which no air was exiting the hatch. Action Report 2000-1173 was initiated to examine the issues associated with this apparent unplanned release.

A survey for particulate activity showed no spread of contamination outside the equipment hatch. For the purposes of calculating a conservative estimate of activity released, the duration of release was estimated to be two hours. The flow rate was estimated to be 20% of Containment vent flow or 2000 SCFM, and maximum radiogas and radioiodine concentrations measured in Containment atmosphere within 24 hours of the release were used. This conservative estimate of activity released was 0.22 Curies total radiogas and 0.82 microCuries total radioiodine. These concentrations resulted in an estimated dose to the maximally exposed individual of 5E-8 rem total body and 6E-9 rem thyroid, according to the methodology and parameters of the ODCM. These doses are included in the dose totals of Table 4A.

3.0 SUMMARY OF GASEOUS RADIOACTIVE EFFLUENTS

The quantities of radioactive material released in gaseous effluents are summarized in tables 1A and 1B. Plant vent and Containment Vent releases are modeled as mixed mode and Air Ejector is modeled as ground level release.

4.0 SUMMARY OF LIQUID RADIOACTIVE EFFLUENTS

The quantities of radioactive material released in liquid effluents are summarized in tables 2A and 2B.

5.0 SOLID WASTE

The quantities of radioactive material released in shipments of solid waste transported from the site during the reporting period are summarized in table 3. Principal nuclides were determined by gamma spectroscopy and non-gamma emitters were calculated from scaling factors determined by an independent laboratory from representative samples of that waste type. The majority of Dry Active Waste is processed utilizing an off-site processor who reduces the volume and then sends the waste for burial.

6.0 LOWER LIMIT OF DETECTION

On July 27, 2000, Permit #2000147 for release of the "A" Monitor tank did not meet required Lower Limit of Detection (LLD) for Cs-137 of 5E-7 uCi/cc due to interference from Ag-110m at 657 Kev. Actual reported LLD was 6.26E-7 uCi/cc.

7.0 RADIOLOGICAL IMPACT

An assessment of doses to the maximally exposed individual from gaseous and liquid effluents was performed for locations representing the maximum dose. In all cases, doses were well below Technical Specification limits as defined in the ODCM. Doses remained elevated above 1998 levels due to elevated gaseous effluent activity from fuel cladding defects in Cycle 28, which lasted from May 1999 until October 2000. Gaseous activity in Cycle 29, beginning with November 2000 data, following repair of the fuel cladding defects, indicate a return to dose levels consistent with those in 1998.

Doses were assessed based upon actual meteorological conditions considering the noble gas exposure, inhalation, ground plane and ingestion pathways. The ingestion pathways considered were the fruit, vegetable, fish, drinking water, goat's milk, cow's milk and meat pathways. The results of this assessment are presented in Tables 4A and 4B. Calculated doses for meteorological sectors north of the plant (WNW through ENE) represent theoretical dose to unoccupied areas.

8.0 METEOROLOGICAL DATA

The annual summary of hourly meteorological data collected during 2000 is not included with this report, but can be made available at the RG&E Ginna Nuclear Power Plant.

9.0 LAND USE CENSUS CHANGES

There were no changes in critical receptor location for dose calculations during the reporting period. There were no large changes in land use within 5 miles of the plant. Additional new homes were built.

10.0 CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

There were no changes to the Offsite Dose Calculation Manual (ODCM) in 2000. A recommendation to rewrite the ODCM to the guidance of NUREG-1301, and to move the ODCM into Technical Specifications Supporting Documentation, was documented in Action Report 2000-0764. Although action on this recommendation was initiated on July 14, 2000, the final Plant Operations Review Committee approval was not received until January 22, 2001. Revision 15 to the ODCM will be included with the 2001 Annual Effluent Operating Report in accordance with Section 6.2 of the ODCM.

11.0 CHANGES TO THE PROCESS CONTROL PROGRAM

There were no changes to the Process Control Program during the reporting period.

12.0 MAJOR CHANGES TO RADWASTE TREATMENT SYSTEMS

There were no major changes to the Radwaste Treatment Systems during the reporting period.

13.0 OPERATIONAL DISCREPANCIES

- Plant Vent Accident Range Radiation Monitor R-14A was out of service from 1/24/00 until 2/17/00 and 12/4/00 until 12/28/00, for corrective maintenance. In both instances other radiation monitoring instrumentation was available to accurately monitor noble gas, particulate, and iodine releases.
- Air Ejector Accident Range Radiation Monitor R-15A was out of service on 5 occasions in 2000. These periods of inoperability were due to an ongoing engineering project to improve sensitivity, accuracy, and precision of the monitor in order to qualify it for measurement of primary to secondary leak rate. This project was successful in eliminating intermittent electronic spiking as a concern in radiation measurement and in increasing signal to noise ratio by a factor of five. The periods of inoperability were 1/24/00 to 2/17/00, 2/22/00 to 3/17/00, 7/4/00 to 8/28/00, and 8/31/00 to 9/7/00. In each instance other radiation monitoring instrumentation was available to accurately monitor noble gas releases.
- R-31, A Main Steam Radiation Monitor, was out of service from 10/31/00 until 11/13/00 for corrective maintenance. During this period other radiation monitoring instrumentation was available to monitor increases in radioactivity in the turbine plant.
- R-32, B Main Steam Radiation Monitor, was out of service from 11/6/00 until 11/13/00 for corrective maintenance. During this period other radiation monitoring instrumentation was available to monitor increases in radioactivity in the turbine plant.

14.0 ERRATA

The following are corrections to discrepancies in the Ginna Station 1999 Annual Effluent Operating Report. These discrepancies were documented in Quality Assurance Audit AINT-2001-0001-JMT and Action Reports 2001-0198, 2001-0399.

- R-16, Containment Fan Cooler Gross Activity Monitor, was out of service greater than 30 days. R-16 was out of service from 3/2/99 until 4/17/99 for corrective maintenance on the Containment Fan Coolers. This fan maintenance is documented in Action Report 1999-0647. Further delay, included in this period, in returning R16 to service resulted from a discrepancy in fan cooler component configuration documented in Action Report 1999-0717.
- R15A, Air Ejector Accident Range Monitor, was described in the 1999 effluent report as being out of service greater than 30 days, although no Special Report was submitted to the Commission. According to the ODCM, R15A is required to be operable when the air ejector is operating. R15A was initially declared inoperable on 3/27/99 during a refueling outage with the air ejector not operating. The air ejector was not operated until 4/22/99 making the period of R15A inoperability, according to Section III.A.2.a.iv and Table III-2 of the ODCM, 29 days.
- R12A, Containment Vent Accident Range Monitor, was described as out of service greater than 7 days from 4/7/99 until 4/18/99 and returned to service on 4/18/99. R12A was actually returned to service on 5/21/99. It was no longer considered inoperable, according to Section III.A.2.a.ii and Table III-2 of the ODCM, on 4/18/99 when the plant entered Mode 4.
- R14A was described as out of service for greater than 7 days from 4/7/99 until 4/18/99. It was actually returned to service on 5/21/99 which was out of service greater than 30 days, and a Special Report to the Commission was submitted on July 22, 1999 describing this condition.
- R14A was described as out of service in excess of 7 days on 10/6/99 and returned to service on 11/3/99. R14 was actually returned to service on 10/30/99.
- Plant Vent flow rate was not determined within the 18 month frequency specified in the ODCM Table III-3. This discrepancy is documented in Action Report 2000-1630. Plant vent flow rate was determined on 8/19/98 and on 11/1/2000, and was satisfactory. Procedure A-1040, Filter Inspection and Testing Program, has been changed to agree with the requirements of the ODCM for Plant Vent and Containment Vent flow rate determinations.
- Noble Gas 1998 monthly curies listed in the [52] Week Running Totals were actually the 1998 [52] Week Running Totals. See attached corrected 1999 [52] Week Running Totals.
- Although not a requirement, an explanation of the increased doses to the public between 1998 and 1999 should have been provided. Radioactive gaseous effluents increased from 26.18 Curies in 1998 to 120.95 Curies in 1999. Likewise, radioiodine released in gaseous effluents increased from 42.22 microCuries to 176.0 microCuries in the same period. These increases in gaseous effluent activity led to increases in offsite doses, which were still significantly below regulatory limits. These increases in gaseous effluent activity were attributed to fuel cladding defects in Cycle 28, which extended from May 1999 until October 2000. The fuel cladding defects were repaired in the October 2000 refueling outage.

ROCHESTER GAS ELECTRIC CORPORATION

Table 1A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
JANUARY - JUNE 2000

	Unit	Quarter 1st	Quarter 2nd	Est. Total Error, %
A. Fission & activation gases				
1. Total release	Ci	1.29E+02	6.44E+01	1.54E+01
2. Average release rate for period	uCi/sec	1.66E+01	8.19E+00	
3. Percent of technical specification limit	%	2.63E-03	1.30E-03	
B. Iodines				
1. Total iodine-131	Ci	3.92E-05	5.01E-05	1.54E+01
2. Average release rate for period	uCi/sec	5.04E-06	6.37E-06	
3. Percent of technical specification limit	%	1.11E-02	1.40E-02	
C. Particulates				
1. Particulates with half-lives > 8days	Ci			1.54E+01
2. Average release rate for period	uCi/sec			
3. Percent of technical specification limit	%			
4. Gross alpha radioactivity	Ci	9.19E-08		
D. Tritium				
1. Total release	Ci	7.45E+00	7.98E+00	9.20E+00
2. Average release rate for period	uCi/sec	9.58E-01	1.02E+00	
3. Percent of technical specification limit	%	1.13E-04	1.19E-04	

Note: Isotope for which no value is given were not identified in applicable releases.

ROCHESTER GAS ELECTRIC CORPORATION

Table 1A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
JULY - DECEMBER 2000

	Unit	Quarter 3rd	Quarter 4th	Est. Total Error, %
A. Fission & activation gases				
1. Total release	Ci	2.61E+02	7.71E+01	1.54E+01
2. Average release rate for period	uCi/sec	3.28E+01	9.70E+00	
3. Percent of technical specification limit	%	5.21E-03	1.54E-03	
B. Iodines				
1. Total iodine-131	Ci	1.18E-04	1.74E-04	1.54E+01
2. Average release rate for period	uCi/sec	1.49E-05	2.19E-05	
3. Percent of technical specification limit	%	3.28E-02	4.82E-02	
C. Particulates				
1. Particulates with half-lives > 8days	Ci	2.80E-07	2.38E-06	1.54E+01
2. Average release rate for period	uCi/sec	3.52E-08	2.99E-07	
3. Percent of technical specification limit	%	2.65E-06	2.25E-05	
4. Gross alpha radioactivity	Ci	5.15E-08	1.06E-08	
D. Tritium				
1. Total release	Ci	1.21E+01	1.43E+01	9.20E+00
2. Average release rate for period	uCi/sec	1.53E+00	1.80E+00	
3. Percent of technical specification limit	%	1.80E-04	2.12E-04	

Note: Isotope for which no value is given were not identified in applicable releases.

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Table 1B

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

Gaseous Effluents-Continuous and Batch Releases

Nuclides released	Unit	Continuous Mode Quarter 1st	Continuous Mode Quarter 2nd	Batch Mode Quarter 1st	Batch Mode Quarter 2nd
1. Fission gases					
argon-41	Ci	4.89E-01	7.98E-01	4.89E-02	5.28E-02
krypton-85	Ci	7.69E-04		6.92E-01	2.28E+00
krypton-85m	Ci	4.20E-01	2.28E-01	2.99E-03	2.92E-05
krypton-87	Ci	3.85E-01	2.40E-01	3.60E-04	
krypton-88	Ci	6.26E-01	4.40E-01	3.27E-03	
xenon-131m	Ci			1.17E-01	2.85E-01
xenon-133	Ci	3.53E+01	5.08E+01	1.91E+00	5.20E+00
xenon-133m	Ci			8.50E+01	1.21E-02
xenon-135	Ci	3.18E+00	3.70E+00	2.51E-02	3.45E-03
xenon-135m	Ci	5.74E-01	3.82E-01		
xenon-138	Ci				
others (specify)	Ci				
	Ci				
	Ci				
	Ci				
Total for period	Ci	4.09E+01	5.66E+01	8.78E+01	7.84E+00

2. Iodines

iodine-131	Ci	3.92E-05	5.01E-05		
iodine-133	Ci	1.29E-05	1.29E-05		
iodine-135	Ci				
Total for period	Ci	5.21E-05	6.30E-05		

3. Particulates

strontium-89	Ci	*	*		
strontium-90	Ci	*	*		
cesium-134	Ci				
cesium-137	Ci				
Nb-95	Ci				
cobalt-58	Ci				
cobalt-60	Ci				
Total for period	Ci				
unidentified	Ci				

Note: Isotope for which no value is given were not identified in applicable releases.

ROCHESTER GAS ELECTRIC CORPORATION

Table 1B

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

Gaseous Effluents-Continuous and Batch Releases

		Continuous Mode		Batch Mode	
Nuclides released	Unit	Quarter 3rd	Quarter 4th	Quarter 3rd	Quarter 4th
1. Fission gases					
argon-41	Ci	3.44E-01	7.59E-01	2.69E-01	7.99E-02
krypton-85	Ci		3.89E-02	4.21E+00	1.95E+00
krypton-85m	Ci	3.52E-01	4.80E-02		4.60E-04
krypton-87	Ci	6.59E-02	1.20E-01		
krypton-88	Ci	2.00E-01			5.88E-04
xenon-131m	Ci		1.35E-02	1.73E+00	1.34E+00
xenon-133	Ci	8.88E+01	8.21E+00	1.58E+02	6.21E+01
xenon-133m	Ci	5.03E-01		4.59E-01	3.87E-01
xenon-135	Ci	4.40E+00	2.02E+00	1.27E-01	7.24E-02
xenon-135m	Ci	8.98E-01	1.94E-04		
xenon-138	Ci				
others (specify)	Ci				
	Ci				
	Ci				
	Ci				
Total for period	Ci	9.56E+01	1.12E+01	1.65E+02	6.59E+01
2. Iodines					
iodine-131	Ci	9.65E-05	1.45E-04	2.20E-05	2.90E-05
iodine-133	Ci	1.19E-05	9.00E-06		1.72E-07
iodine-135	Ci				
Total for period	Ci	1.08E-04	1.54E-04	2.20E-05	2.92E-05
3. Particulates					
strontium-89	Ci		1.69E-07		
strontium-90	Ci				
cesium-134	Ci				
cesium-137	Ci				
Nb-95	Ci				
cobalt-58	Ci	2.80E-07	2.21E-06		
cobalt-60	Ci				
Total for period	Ci	2.80E-07	2.38E-06		
unidentified	Ci	2.80E-07	2.38E-06		

Note: Isotope for which no value is given were not identified in applicable releases.

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Table 2A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
JANUARY - JUNE 2000

A. Fission and activation products	Unit	Quarter 1st	Quarter 2nd	Est.Total Error, %
1. Total release (not including tritium, gases, alpha)	Ci	3.30E-05	5.63E-05	9.90E+00
2. Average diluted concentration during period	uCi/ml	2.48E-13	3.33E-13	
3. Percent of applicable limit	%	2.43E-06	4.13E-07	
B. Tritium				
1. Total release	Ci	9.88E+01	1.72E+02	9.20E+00
2. Average diluted concentration during period	uCi/ml	7.43E-07	1.02E-06	
3. Percent of applicable limit	%	2.48E-02	3.39E-02	
C. Dissolved and entrained gases				
1. Total release	Ci	2.00E-05	1.31E-03	9.90E+00
2. Average diluted concentration during period	uCi/ml	1.51E-13	7.75E-12	
3. Percent of applicable limit	%	7.53E-08	3.88E-06	
D. Gross alpha radioactivity				
1. Total release	Ci	N/A	N/A	
E. Vol. of waste released (prior to dilution)	Liters	2.93E+07	2.23E+07	
F. Vol. of dilution water used during period	Liters	1.33E+11	1.69E+11	

Note: Isotope for which no value is given were not identified in applicable releases.

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Table 2A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
JULY - DECEMBER 2000

	Unit	Quarter 3rd	Quarter 4th	Est.Total Error, %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	5.67E-04	1.20E-04	9.90E+00
2. Average diluted concentration during period	uCi/ml	3.67E-12	8.98E-13	
3. Percent of applicable limit	%	5.07E-06	9.31E-07	
B. Tritium				
1. Total release	Ci	9.46E+01	2.41E+01	9.20E+00
2. Average diluted concentration during period	uCi/ml	6.13E-07	1.81E-07	
3. Percent of applicable limit	%	2.04E-02	6.02E-03	
C. Dissolved and entrained gases				
1. Total release	Ci	2.48E-03	1.61E-04	9.20E+00
2. Average diluted concentration during period	uCi/ml	1.61E-11	1.20E-12	
3. Percent of applicable limit	%	8.05E-06	6.02E-07	
D. Gross alpha radioactivity				
1. Total release	Ci	N/A	N/A	
E. Vol. of waste released (prior to dilution)	Liters	3.28E+07	2.22E+07	
F. Vol. of dilution water used during period	Liters	1.54E+11	1.34E+11	

Note: Isotope for which no value is given were not identified in applicable releases.

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Table 2B
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter	Quarter	Quarter	Quarter
		1st	2nd	1st	2nd
chromium-51	Ci				
manganese-54	Ci				
iron-55	Ci				
iron-59	Ci				
cobalt-58	Ci				
cobalt-60	Ci			9.03E-06	1.10E-06
zinc-65	Ci				
strontium-89	Ci				
strontium-90	Ci				
zirconium/niobium-95	Ci				
molybdenum-99	Ci				
silver-110m	Ci				
antimony-122	Ci				
antimony-124	Ci				
antimony-125	Ci			1.16E-05	5.21E-05
iodine-131	Ci				
iodine-133	Ci				
iodine-135	Ci				
cesium-134	Ci				
cesium-136	Ci				
cesium-137	Ci			7.38E-07	3.08E-06
barium/lanthanum-140	Ci				
cerium-141	Ci				
Te-123m	Ci				
Te-132	Ci				
Total for period (above)	Ci			2.14E-05	5.63E-05
unidentified	Ci				
xenon-133	Ci			2.00E-05	1.30E-03
xenon-135	Ci				6.03E-06

Note: Isotope for which no value is given were not identified in applicable releases.

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Table 2B

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

LIQUID EFFLUENTS

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter	Quarter	Quarter	Quarter
		3rd	4th	3rd	4th
chromium-51	Ci				
manganese-54	Ci				
iron-55	Ci				
iron-59	Ci				
cobalt-58	Ci			1.83E-04	1.19E-04
cobalt-60	Ci			1.83E-04	
zinc-65	Ci				
strontium-89	Ci				
strontium-90	Ci				
zirconium/niobium-95	Ci				
molybdenum-99	Ci				
silver-110m	Ci			3.54E-06	
antimony-122	Ci				
antimony-124	Ci				
antimony-125	Ci			1.92E-04	
iodine-131	Ci				
iodine-133	Ci				
iodine-135	Ci				
cesium-134	Ci				
cesium-136	Ci				
cesium-137	Ci			6.07E-06	1.10E-06
barium/lanthanum-140	Ci				
cerium-141	Ci				
Ru-106	Ci				
Ru-103	Ci				
Total for period (above)	Ci			5.67E-04	1.20E-04
unidentified	Ci				
xenon-133	Ci			2.47E-03	1.61E-04
xenon-135	Ci			1.04E-05	

Note: Isotope for which no value is given were not identified in applicable releases.

Table 3
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
January 1, 2000 - December 31, 2000

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL - (Not irradiated fuel)

1. Type of waste	Unit	12 month period	Est. total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	0 0	N/A N/A
b. Dry compressible waste, contaminated equip, etc.	m^3 Ci	20.9 0.104	7.0 E+00 7.0 E+00
c. Irradiated components, control rods, etc.	m^3 Ci	N/A N/A	N/A N/A
d. Other:	m^3 Ci	N/A N/A	N/A N/A

2.Estimate of major nuclide composition (by type of waste)								
a.			b.			d.		
	%		Co-58	%	6.0		%	
	%		Fe-55	%	32.2		%	
	%		Cr-51	%	23.5		%	
	%		Co-60	%	24.2		%	
	%		Ni-63	%	9.4		%	
	%		Mn-54	%	2.0		%	
	%		Fe-59	%	0.8		%	
	%			%			%	
	%			%			%	
	%			%			%	
	%			%			%	
	%			%			%	
	%			%			%	
	%			%			%	
Total			Total		99.4%	Total		

3. Solid Waste Disposition		
Number of Shipments	**Mode of Transportation**	**Destination**
2	Sole use truck	Oak Ridge, TN
2	Sole use truck	Barnwell, SC

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None		

Table 4A

Radiation Dose to Nearest Individual Individual Receptor

From Gaseous Releases

First Quarter 2000

(Units In rem)

	ADULT			TEEN			CHILD			INFANT		
	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN
N	2.1E-08	2.2E-08	2.7E-08	2.1E-08	2.2E-08	2.7E-07	2.0E-08	2.0E-08	2.7E-08	1.6E-08	1.6E-08	2.70E-08
NNE	2.1E-08	2.1E-08	2.6E-08	2.1E-08	2.1E-08	2.6E-08	2.0E-08	2.0E-08	2.6E-08	1.6E-08	1.6E-08	2.6E-08
NE	1.4E-08	1.5E-08	1.8E-08	1.4E-08	1.5E-08	1.8E-08	1.3E-08	1.4E-08	1.8E-08	1.1E-08	1.1E-08	1.8E-08
ENE	1.4E-08	1.4E-08	1.8E-08	1.4E-08	1.4E-08	1.8E-08	1.3E-08	1.3E-08	1.8E-08	1.0E-08	1.1E-08	1.8E-08
E	3.1E-07	3.1E-07	4.7E-07	3.1E-07	3.1E-07	4.7E-07	3.0E-07	3.1E-07	4.7E-07	2.7E-07	2.7E-07	4.7E-07
ESE	3.8E-07	3.8E-07	5.8E-07	3.8E-07	3.8E-07	5.8E-07	3.7E-07	3.7E-07	5.8E-07	3.3E-07	3.3E-07	5.8E-07
SE	3.6E-07	3.6E-07	5.4E-07	3.6E-07	3.6E-07	5.4E-07	3.5E-07	3.5E-07	5.4E-07	3.1E-07	3.2E-07	5.4E-07
SSE	1.8E-07	1.8E-07	2.7E-07	1.8E-07	1.8E-07	2.7E-07	1.8E-07	1.8E-07	2.7E-07	1.6E-07	1.6E-07	2.7E-07
S	2.1E-07	2.2E-07	3.2E-07	2.1E-07	2.2E-07	3.2E-07	2.1E-07	2.1E-07	3.2E-07	1.9E-07	1.9E-07	3.2E-07
SSW	1.7E-07	1.7E-07	2.6E-07	1.7E-07	1.7E-07	2.6E-07	1.6E-07	1.7E-07	2.6E-07	1.5E-07	1.5E-07	2.6E-07
SW	1.8E-07	1.8E-07	2.8E-07	1.8E-07	1.8E-07	2.8E-07	1.7E-07	1.8E-07	2.8E-07	1.5E-07	1.6E-07	2.8E-07
WSW	7.1E-08	7.2E-08	1.1E-07	7.1E-08	7.2E-08	1.1E-07	6.9E-08	7.0E-08	1.1E-07	6.2E-08	6.3E-08	1.1E-07
W	1.3E-07	1.3E-07	2.0E-07	1.3E-07	1.3E-07	2.0E-07	1.3E-07	1.3E-07	2.0E-07	1.1E-07	1.2E-07	2.0E-07
WNW	1.8E-08	1.8E-08	2.9E-08	1.8E-08	1.8E-08	2.9E-08	1.8E-08	1.8E-08	2.9E-08	1.6E-08	1.6E-08	2.9E-08
NW	5.6E-09	5.7E-09	7.3E-09	5.6E-09	5.8E-09	7.3E-09	5.3E-09	5.5E-09	7.3E-09	4.3E-09	4.5E-09	7.3E-09
NNW	1.3E-08	1.3E-08	1.7E-08	1.3E-08	1.3E-08	1.7E-08	1.2E-08	1.3E-08	1.7E-08	9.9E-09	1.0E-08	1.7E-08
MAX.	3.8E-07	3.8E-07	5.8E-07	3.8E-07	3.8E-07	5.8E-07	3.7E-07	3.7E-07	5.8E-07	3.3E-07	3.3E-07	5.8E-07

Table 4A

Radiation Dose to Nearest Individual Individual Receptor
From Gaseous Releases
Second Quarter 2000
(Units In rem)

	ADULT			TEEN			CHILD			INFANT		
	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN
N	2.4E-08	2.4E-08	4.7E-08	2.4E-08	2.5E-08	4.7E-08	2.3E-08	2.4E-08	4.7E-08	2.0E-08	2.1E-08	4.7E-08
NNE	2.8E-08	2.9E-08	5.4E-08	2.8E-08	2.9E-08	5.4E-08	2.7E-08	2.8E-08	5.4E-08	2.4E-08	2.5E-08	5.4E-08
NE	2.7E-08	2.7E-08	5.1E-08	2.7E-08	2.8E-08	5.1E-08	2.6E-08	2.7E-08	5.1E-08	2.2E-08	2.3E-08	5.1E-08
ENE	2.3E-08	2.4E-08	4.5E-08	2.3E-08	2.4E-08	4.5E-08	2.2E-08	2.3E-08	4.5E-08	2.0E-08	2.1E-08	4.5E-08
E	4.3E-07	5.3E-07	7.3E-07	4.4E-07	5.5E-07	7.3E-07	4.6E-07	6.5E-07	7.3E-07	3.7E-07	6.1E-07	7.3E-07
ESE	5.6E-07	7.3E-07	9.6E-07	5.7E-07	7.5E-07	9.6E-07	5.9E-07	9.2E-07	9.6E-07	4.9E-07	9.3E-07	9.6E-07
SE	3.5E-07	4.3E-07	6.3E-07	3.6E-07	4.4E-07	6.3E-07	3.7E-07	5.1E-07	6.3E-07	3.3E-07	5.3E-07	6.3E-07
SSE	1.3E-07	1.5E-07	2.3E-07	1.4E-07	1.6E-07	2.3E-07	1.4E-07	1.8E-07	2.3E-07	1.3E-07	1.9E-07	2.3E-07
S	2.5E-07	2.8E-07	3.9E-07	2.5E-07	2.9E-07	3.9E-07	2.5E-07	3.2E-07	3.9E-07	2.1E-07	2.8E-07	3.9E-07
SSW	1.9E-07	2.1E-07	3.1E-07	2.0E-07	2.2E-07	3.1E-07	2.0E-07	2.4E-07	3.1E-07	1.8E-07	2.4E-07	3.1E-07
SW	4.6E-07	5.6E-07	7.5E-07	4.7E-07	5.8E-07	7.5E-07	4.9E-07	6.7E-07	7.5E-07	4.2E-07	6.7E-07	7.5E-07
WSW	3.7E-07	4.5E-07	6.1E-07	3.8E-07	4.8E-07	6.1E-07	4.1E-07	5.7E-07	6.1E-07	3.4E-07	6.0E-07	6.1E-07
W	3.4E-07	3.8E-07	5.8E-07	3.5E-07	3.9E-07	5.8E-07	3.7E-07	4.5E-07	5.8E-07	3.0E-07	4.4E-07	5.8E-07
WNW	4.0E-08	4.2E-08	8.5E-08	4.1E-08	4.3E-08	8.5E-08	4.3E-08	4.6E-08	8.5E-08	3.4E-08	3.4E-08	8.5E-08
NW	8.7E-09	8.9E-09	1.6E-08	8.7E-09	9.0E-09	1.6E-08	8.4E-09	8.7E-09	1.6E-08	7.4E-09	7.7E-09	1.6E-08
NNW	1.2E-08	1.2E-08	2.1E-08	1.2E-08	1.2E-08	2.1E-08	1.2E-08	1.2E-08	2.1E-08	1.0E-08	1.0E-08	2.1E-08

MAX.	5.6E-07	7.3E-07	9.6E-07	5.7E-07	7.5E-07	9.6E-07	5.9E-07	9.2E-07	9.6E-07	4.9E-07	9.3E-07	9.6E-07

Table 4A

Radiation Dose to Nearest Individual Individual Receptor

From Gaseous Releases

Third Quarter 2000

(Units In rem)

	ADULT			TEEN			CHILD			INFANT		
	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN
N	6.3E-08	6.5E-08	1.4E-07	6.3E-08	6.4E-08	1.4E-07	6.1E-08	6.3E-08	1.4E-07	5.6E-08	5.8E-08	1.4E-07
NNE	9.20E-08	9.4E-08	2.1E-07	9.2E-08	9.5E-08	2.1E-07	9.0E-08	9.3E-08	2.1E-07	8.2E-08	8.5E-08	2.1E-07
NE	9.2E-08	9.4E-08	2.1E-07	9.3E-08	9.4E-08	2.1E-07	9.0E-08	9.2E-08	2.1E-07	8.3E-08	8.5E-08	2.1E-07
ENE	5.4E-08	5.5E-08	1.2E-07	5.4E-08	5.5E-08	1.2E-07	5.3E-08	5.4E-08	1.2E-07	4.9E-08	5.0E-08	1.2E-06
E	3.4E-07	5.3E-07	6.1E-07	3.5E-07	5.5E-07	6.1E-07	3.9E-07	7.2E-07	6.1E-07	2.8E-07	6.9E-07	6.1E-07
ESE	6.2E-07	9.1E-07	1.2E-06	6.4E-07	9.4E-07	1.2E-06	6.9E-07	1.2E-06	1.2E-06	5.4E-07	1.2E-06	1.2E-06
SE	7.9E-07	1.2E-06	1.5E-06	8.1E-07	1.2E-06	1.5E-06	8.6E-07	1.5E-06	1.5E-06	6.9E-07	1.5E-06	1.5E-06
SSE	3.4E-07	4.5E-07	6.2E-07	3.5E-07	4.7E-07	6.2E-07	3.8E-07	6.1E-07	6.2E-07	3.0E-06	6.7E-07	6.2E-07
S	7.2E-07	1.2E-06	1.2E-06	7.4E-07	1.2E-06	1.2E-06	8.3E-07	1.6E-06	1.2E-06	5.4E-07	1.2E-06	1.2E-06
SSW	7.3E-07	1.5E-06	1.3E-06	7.6E-07	1.5E-06	1.3E-06	8.3E-07	2.1E-06	1.3E-06	5.9E-07	1.5E-06	1.3E-06
SW	7.6E-07	1.2E-06	1.4E-06	7.8E-07	1.3E-06	1.4E-06	8.5E-07	1.7E-06	1.4E-06	6.6E-07	1.8E-06	1.4E-06
WSW	4.2E-07	6.0E-07	6.7E-07	4.4E-07	6.5E-07	6.7E-07	5.1E-07	8.7E-07	6.7E-07	3.7E-07	9.6E-07	6.7E-07
W	2.6E-07	3.3E-07	4.0E-07	2.8E-07	3.6E-07	4.0E-07	3.3E-07	4.8E-07	4.0E-07	2.2E-07	5.0E-07	4.0E-07
WNW	2.8E-08	4.3E-08	4.9E-08	2.9E-08	4.2E-08	4.9E-08	3.3E-08	5.2E-08	4.9E-08	1.9E-08	1.9E-08	4.9E-08
NW	3.1E-08	3.2E-08	7.2E-08	3.1E-08	3.2E-08	7.2E-08	3.0E-08	3.1E-08	7.2E-08	2.8E-08	2.9E-08	7.2E-08
NNW	3.0E-08	3.1E-08	6.9E-08	3.0E-08	3.1E-08	6.9E-08	3.0E-08	3.0E-08	6.9E-08	2.7E-08	2.8E-08	6.9E-08
MAX.	7.9E-07	1.5E-06	1.5E-06	8.1E-07	1.5E-06	1.5E-06	8.6E-07	2.1E-06	1.5E-06	3.0E-06	1.8E-06	1.5E-06

Table 4A

Radiation Dose to Nearest Individual Individual Receptor
From Gaseous Releases
Fourth Quarter 2000
(Units In rem)

	ADULT			TEEN			CHILD			INFANT		
	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN	T.BODY	THYRD	SKIN
N	2.7E-08	2.8E-08	2.2E-08	2.7E-08	2.9E-08	2.2E-08	2.5E-08	2.7E-08	2.2E-08	1.8E-08	1.9E-08	2.2E-08
NNE	3.5E-08	3.8E-08	3.6E-08	3.5E-08	3.8E-08	3.6E-08	3.3E-08	3.6E-08	3.6E-08	2.4E-08	2.7E-08	3.6E-08
NE	4.2E-08	4.4E-08	3.8E-08	4.2E-08	4.5E-08	3.8E-08	3.9E-08	4.2E-08	3.8E-08	2.8E-08	3.1E-08	3.8E-08
ENE	3.8E-08	4.0E-08	3.1E-08	3.8E-08	4.1E-08	3.1E-08	3.5E-08	3.8E-08	3.1E-08	2.5E-08	2.8E-08	3.1E-08
E	3.7E-07	6.0E-07	3.5E-07	3.8E-07	6.2E-07	3.5E-07	4.0E-07	8.0E-07	3.5E-07	2.6E-07	7.4E-07	3.5E-07
ESE	2.9E-07	7.7E-07	3.1E-07	2.9E-07	7.7E-07	3.1E-07	3.1E-07	1.2E-06	3.1E-07	2.1E-07	1.2E-06	3.1E-07
SE	3.3E-07	5.1E-07	2.8E-07	3.3E-07	5.3E-07	2.8E-07	3.3E-07	6.6E-07	2.8E-07	2.3E-07	6.3E-07	2.8E-07
SSE	1.9E-07	3.5E-07	1.6E-07	2.0E-07	3.8E-07	1.6E-07	2.0E-07	5.3E-07	1.6E-07	1.4E-07	6.6E-07	1.6E-07
S	7.2E-07	1.8E-06	7.6E-07	7.4E-07	1.8E-06	7.6E-07	8.0E-07	2.5E-06	7.6E-07	4.8E-07	1.8E-06	7.6E-07
SSW	4.0E-07	1.2E-06	4.3E-07	4.1E-07	1.2E-06	4.3E-07	4.4E-07	1.7E-06	4.3E-07	2.8E-07	1.2E-06	4.3E-07
SW	1.7E-07	4.3E-07	1.6E-07	1.8E-07	4.5E-07	1.6E-07	1.9E-07	6.6E-07	1.6E-07	1.2E-07	7.5E-07	1.6E-07
WSW	1.5E-07	3.8E-07	1.4E-07	1.5E-07	4.1E-07	1.4E-07	1.7E-07	6.2E-07	1.4E-07	1.1E-07	7.6E-07	1.4E-07
W	1.1E-07	1.7E-07	9.5E-08	1.2E-07	2.0E-07	9.5E-08	1.3E-07	2.7E-07	9.5E-08	8.3E-08	3.5E-07	9.5E-08
WNW	2.2E-08	2.6E-08	2.6E-08	2.2E-08	2.5E-08	2.6E-08	2.1E-08	2.+6e-8	2.6E-08	1.7E-08	1.7E-08	2.6E-08
NW	8.6E-09	8.9E-09	4.8E-09	8.7E-09	8.9E-09	4.8E-09	7.9E-09	8.2E-09	4.8E-09	5.3E-09	5.6E-09	4.8E-09
NNW	1.4E-08	1.5E-08	8.2E-09	1.4E-08	1.5E-08	8.2E-09	1.3E-08	1.4E-08	8.2E-09	8.8E-09	9.4E-09	8.2E-09
MAX.	7.2E-07	1.8E-06	7.6E-07	7.4E-07	1.8E-06	7.6E-07	8.0E-07	2.5E-06	7.6E-07	4.8E-07	1.8E-06	7.6E-07

Radiation Dose To Nearest Individual Receptor

From Liquid Release

2000

(Units in rem)

	Adult	Teen	Child	Infant
		First Quarter		
T. Body	1.60E-09	1.20E-09	2.10E-09	2.00E-09
Bone	5.40E-12	5.80E-12	7.40E-12	9.70E-14
Thyroid	1.60E-09	1.20E-09	2.10E-09	2.00E-09
		Second Quarter		
T. Body	2.30E-09	1.60E-09	3.00E-09	2.80E-09
Bone	4.80E-12	5.10E-12	6.50E-12	8.60E-14
Thyroid	2.30E-09	1.60E-09	3.00E-09	2.80E-09
		Third Quarter		
T. Body	1.50E-09	1.00E-09	1.90E-09	1.80E-09
Bone	1.20E-11	1.20E-11	1.60E-11	2.10E-13
Thyroid	1.50E-09	1.00E-09	1.90E-09	1.80E-09
		Fourth Quarter		
T. Body	4.80E-10	3.40E-10	6.20E-10	5.80E-10
Bone	3.40E-12	3.70E-12	4.60E-12	6.10E-14
Thyroid	4.70E-10	3.40E-10	6.20E-10	5.80E-10

ROCHESTER GAS AND ELECTRIC

[52] WEEK RUNNING TOTALS

FOR : 1999

MONTH OF	NOBLE GAS 1998 CURIES	NOBLE GAS 1999 CURIES	[52] WEEK NOBLE GAS RUNNING TOTAL Ci.	I-131 1998 uCi	I-131 1999 uCi	[52] WEEK I-131 RUNNING TOTAL uCi
	LAST YEARS TOTAL 26.194			LAST YEARS TOTAL 42.232		
JANUARY	4.08	2.12	24.22	3.93	3.82	42.11
FEBUARY	2.27	1.90	23.85	3.41	3.41	42.11
MARCH	2.16	2.45	24.14	3.78	9.15	47.48
APRIL	2.17	1.63	23.61	3.66	3.75	47.57
MAY	2.16	10.52	31.97	3.78	5.57	49.36
JUNE	2.07	29.97	59.86	3.66	48.48	94.18
JULY	0.09	12.43	72.20	0.01	24.61	118.79
AUGUST	2.09	9.30	79.41	3.66	14.30	129.43
SEPTEMBER	2.81	23.89	100.49	5.07	0.01	124.36
OCTOBER	2.08	12.82	111.23	3.78	16.60	137.18
NOVEMBER	2.06	2.39	111.56	3.66	32.30	165.82
DECEMBER	2.15	11.55	120.96	3.82	14.00	176.00
YEARLY TOTALS	26.18 CURIES	120.96 CURIES		42.22 uCi	176.00 uCI	

NOTE: The 52 week running total is not to exceed 25,000 curies for noble gases.

ROCHESTER GAS AND ELECTRIC

[52] WEEK RUNNING TOTALS

FOR : 2000

MONTH OF	NOBLE GAS 1999 CURIES	NOBLE GAS 2000 CURIES	[52] WEEK NOBLE GAS RUNNING TOTAL Ci.	I-131 1990 uCi	I-131 2000 uCi	[52] WEEK I-131 RUNNING TOTAL uCi
	LAST YEARS TOTAL 120.95			LAST YEARS TOTAL 42.222		
JANUARY	2.12	9.48	128.32	3.93	4.32	42.61
FEBUARY	1.90	12.67	139.09	3.41	12.10	51.30
MARCH	2.45	106.57	243.21	3.78	22.80	70.32
APRIL	1.63	15.77	257.35	3.66	10.20	76.86
MAY	10.52	25.28	272.11	3.78	25.70	98.78
JUNE	29.97	23.38	265.52	3.66	14.20	109.32
JULY	12.43	148.89	401.99	0.01	8.08	117.40
AUGUST	9.30	24.35	417.04	3.66	19.50	133.24
SEPTEMBER	23.89	87.58	480.72	5.07	90.87	219.04
OCTOBER	12.82	71.27	539.18	3.78	162.00	377.26
NOVEMBER	2.39	2.54	539.33	3.66	6.44	380.03
DECEMBER	11.55	3.28	531.06	3.82	5.93	382.14
YEARLY TOTALS	120.96 CURIES	531.06 CURIES		42.22 uCi	382.14 uCI	

NOTE: The 52 week running total is not to exceed 25,000 curies for noble gases